



BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Diploma in Building Services Engineering Pearson BTEC International Level 3 Extended Diploma in Building Services Engineering
Unit number and title	Unit 26: Heating, Ventilation and Air Conditioning Design
Learning aim(s) (For NQF only)	B: Apply the principles of ventilation, warm-air heating and air-conditioning requirements for simple single-zone air-conditioning installations and buildings C: Develop appropriate systems and specifications for ventilation and air-conditioning systems, ductwork, plant and equipment
Assignment title	Assignment 2 – Designing a Ventilation and Air-Conditioning system for an Office
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are employed as a trainee engineer with a heating and ventilation company that works with building contractors who specialise in the development of commercial buildings. The company has received an enquiry from a contractor who has a contract to build a three storey office block. Your company has been asked to make a proposal for the ventilation and air-conditioning system for the building. The project manager of the team you work in has asked you to work with them on the proposal. Ventilation is to be provided via a mechanical system that incorporates a heater/cooler battery. Figure 1 shows the floor plan for the second floor. The following design data are also provided: Required internal temperature 21^oc Minimum outside temperature -1^oc Air changes per hour 3 Height between floors 3.5m Suspended ceilings will be used Assume windows make up 20% of the wall area U Values (W/m²K):
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	External walls 0.20 Roof 0.18 Floor 0.00 Windows 1.80
Task 1	The document produced for Assignment 1 set out the type of terminal diffuser/grills, ductwork and air-handling unit required for the ventilation and air-conditioning of the second floor of the office block. A design for the system of this floor is to be developed. The final design will provide ventilation to the office block and will either heat or cool the incoming air to maintain a comfortable environment for the occupants of the building. In order to meet the company's quality procedures, you need to keep a design file. This will need to include the following information: • Calculation of the volume of air to be handled • Calculation of the heat/cooling load taking into consideration the difference between the required internal temperature and potential external temperatures, the heat loss through the fabric of the building and the effect of air changes • The potential air flows and velocities through the supply and extract ductwork • Sketch diagram of the system • Description of the system components, air-handling unit, ducting including jointing and fixing, terminal diffusers/grills and extract fan(s) • Schedule of appropriate components selected from manufacturers literature; copies of which should be included • Reason for each of the components in the system with details of how it functions • Statement of how the system will operate • Detailed schematic drawing of the system • Statement giving the reason for why the proposed design is the most appropriate option



Checklist of evidence required	Completed design file. Text sections should be word processed. Calculations may be in neat handwriting. Manufacturers' literature and a detailed schematic drawing should be included.
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Criteria covered by this task:

Unit/Criteria reference	To achieve the criteria you must show that you are able to:
26/B.P2	Produce a systems diagram for a basic air-conditioning and ventilation system.
26/B.P3	Assess the system to be installed in terms of ductwork, jointing and related ancillary components for a simple single-zone installation.
26/B.P4	Assess the air flow rates and supply conditions
26/B.M2	Produce a design for a detailed ventilation and air-conditioning system that mostly meets the requirements of the scenario.
26/B.D2	Produce a comprehensive design for a detailed ventilation and air-conditioning system that fully meets the requirements of the scenario.
26/C.P5	Select an appropriate ventilation and air-conditioning system for use in a given scenario.
26/C.P6	Select appropriate ductwork, plant and equipment for use within a given scenario.
26/C.M3	Justify the selection of an appropriate ventilation and air-conditioning system that meets most of the needs of the given scenario.
26/C.D3	Evaluate the selection of an appropriate ventilation and air-conditioning system and components, including details of the strategy and schematic drawings for the given scenario.

Sources of information to support you with this Assignment	Burberry, P, Environment and Services (Mitchells Building Series), (8th edition), Routledge, 2015, ISBN 9781138167780. This book explains principles of services installations and environmental considerations and is relevant to the content of this unit. Greeno, R, Building Services Handbook (8th edition), Routledge, 2015, ISBN 9781138805637. This book is a handbook covering all aspects of building services in a concise manner. McMullan R. Environmental Science in Building, 7th Edition Palgrave Macmillan, 2012 ISBN 9780230290808 The most recognised book which is considered a credible text regarding building science. Arvind Agrawal, Air Conditioning Design, 1st Edition New Academic Science Ltd, 2018 by ISBN 978-1781831229 This book is aimed at undergraduate students which covers the design technique in a simple step-by-step method from first principles.
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	Journals Building Services Engineering Research & Technology (BSERT), Sage Publishing This is CIBSE's quarterly journal containing useful research relevant to all aspects of building services engineering. http://journals.sagepub.com/home/bse P & HE Journal, Chartered Institute of Plumbing and Heating Engineers (CIPHE) This is the CIPHE online journal which covers a broad range of areas relating to plumbing and heating. http://www.ciphe.org.uk/professional-members/publications/ Websites http://www.cibse.org/ This is the website of Chartered Institute of Building Services Engineers (CIBSE) which is the professional body for building services engineers. The website contains information about the codes, products and industry updates. http://www.modbs.co.uk/ This is the website of Modern Building Services (MBS) covering a wide range of building services engineering sectors. Further Resources may be found at: qualifications.pearson.com/en/support/published-resources.html Note to Tutors: This list of resources should be customised to reflect the resources available within the centre
Other assessment materials attached to this Assignment Brief	<i>Figure 1 – Second floor plan.</i>